

# **Critical Design Reviews**

## **Project: SAPHIRE 8**

September 2011



The INL is a U.S. Department of Energy National Laboratory  
operated by Battelle Energy Alliance

# **Critical Design Reviews Project: SAPHIRE 8**

**September 2011**

**Idaho National Laboratory  
Idaho Falls, Idaho 83415**

**<http://www.inl.gov>**

**Prepared for the  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555**

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	Revision:	0
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## REVISION LOG

<b><u>Revision Number</u></b>	<b><u>Effective Date</u></b>	<b><u>Affected Pages</u></b>	<b><u>Description of Change</u></b>
0	04/22/2011	0	Initial

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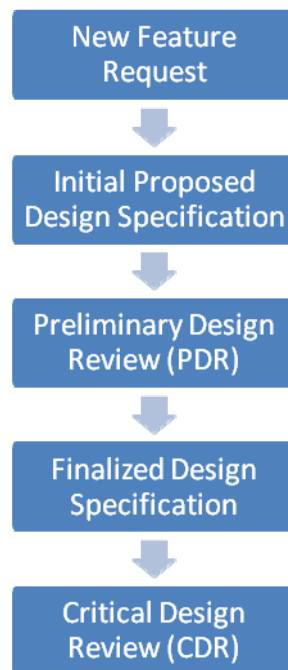
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## 1. Critical Design Reviews

### 1.1 Introduction

The Critical Design Review (CDR) is intended to be performed at the phase of the design request immediately before proceeding to implementation of the design request. The design request is initiated with a Design Specification document which includes a problem statement, design details, a design checklist and supporting documentation and/or projected sample output. The document then records the process through the Preliminary Design Review (PDR) and on to the finalized design specification. In addition to this, the design specification has a chapter devoted to the completion of the CDR. This document describes the process of documentation of the CDR in the Design Specification.



A CDR is meant to ensure that the customer and developer are in agreement with the design before finishing work and implementation into SAPHIRE 8. The customer requests a new feature for SAPHIRE 8 through a variety of means such as a NRC Form 173. Conceptualization work is performed through communication between the project owner, customer and developer to develop the proposed design. The CDR is performed once the proposed work from the Preliminary Design Review set forth in the Design Specification has been completed. The Design Specification is both the formal document describing the design in detail and a detailed record of iterative changes. For every design review a new revision of the Design Specification will be produced. Multiple CDRs may be performed as an iterative process to finalize the design specification before implementation of the design into SAPHIRE 8.

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## 1.2 Design Requests

The design request arises from a need either perceived as a new feature or one that is meant to enhance a current feature of SAPHIRE 8. The design request is agreed upon initially in draft by the NRC and the developer after which a design specification is written.

## 1.3 Design Specification

The design specification is produced both to describe the enhanced feature requested and to document the iterative process of the PDRs and the CDRs performed prior to implementing the design into SAPHIRE 8. As a minimum, the design specification consists of the following sections:

- Introduction
  - Includes the problem statement, supporting paragraphs explaining why the design is needed and what the goals are of the design.
- Design Details
  - Covers the proposed functionality of the enhancement
  - Includes projected screen shots, forms, and/or reports
- Design Checklist
  - Lists each change to the software that is required to make the entire requested enhancement a reality
    - These checklist items become the requirements used in the requirements traceability matrix for the design change
- Revision Log
  - Documents the iterative process of design specification and design reviews
- Preliminary Design Review
  - Documents the iterative process and also documents the acceptance of the preliminary design
- Critical Design Review
  - Documents the iterative process and also documents the acceptance of the final design
- Appendices
  - Proposed reports, screenshots, etc...

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## 1.4 Critical Design Review Process

The CDR is recommended to be accomplished through a web meeting at least consisting of the primary development team. As a minimum the following individuals/representatives should be present:

- NRC Technical Staff
- SAPHIRE Project Principal Investigator or other Key Personnel
- SAPHIRE Project Software Quality Assurance Personnel

In addition to these members it is recommended to have a representative from users of the software. Ideal candidates for representation would be SPAR modelers, NRC site workers, and other users outside of the INL or NRC realm. The purpose is to present as many diverse viewpoints as possible to flesh out any required changes.

A CDR presentation needs to include the actual working module or feature being developed. It can then be demonstrated via the web meeting for review.

All required CDR group representatives must agree at the web meeting or in writing at a later date or if the web meeting is not used (email is sufficient) that the proposed design is satisfactory to move forward to implementation of the design. The CDR iterative process is annotated in the Design Specification document as accepted or lists what is rejected and needs worked on. The CDR will be documented as a living document until acceptance of the CDR, after which the design can be taken to implementation. A web meeting is not required for follow-up CDRs, nor is it required for the first one, just recommended. The Project Owner will use best judgment to schedule the most beneficial CDR meeting type for the design in being reviewed.

A signature table for each design review will be part of the design specification:

**Table 1: Critical Design Review Signature Table**

<b>Critical Design Review # 1</b>				
Reviewer	Name	Date	Appraisal Status*	Notes (Explain status if necessary)
NRC Technical Staff				
SAPHIRE Project Principal Investigator or other Key Personnel				
SAPHIRE Project Software Quality Assurance Personnel				

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\* Appraisal Status: 1=Accepted as is, 2=Accepted with minor modifications, 3=Rejected

The table can be repeated as many times as necessary to document each iterative process until there is complete agreement of accepted or accepted with minor modifications. This table can be signed electronically by referencing supporting documents such as emails received that can be placed in the document below the signature table. The updating of the signature table electronically will be performed by the design specification document's owner. The owner will be the Project Principal Investigator (PI) or whomever the PI assigns to this task.

#### 1.4.1 Minor Modifications

A minor modification is one that would not require the design to be re-evaluated in a CDR prior to implementation of the feature. The definition of a minor modification is one that does not change the function of the design. For instance, re-naming a choice in a pull-down menu would be a minor modification. Adding a new choice in a pull-down menu with a completely different report result would not be a minor modification. The notes section should explain the modification so that others in the approval group can agree or disagree.

#### 1.4.2 CDR Iterative Process

The CDR iterative process is a documentation of the communication between the development team. It is not expected that every conversation be recorded within this process. What should be recorded is every point at which the design is presented as ready for implementation, where all the features not requiring minor modifications are developed and ready to go.

A new revision of the design specification is presented for each newly requested CDR.

The response from the design development team is annotated in the table under the Critical Design Review chapter. Prior responses for prior revisions are kept as a record. Response emails or phone conversation dates are annotated below the table. Keep all as a running record of the CDR process.

Once a CDR has acceptance from all parties it constitutes final acceptance of the newly developed design. The design can then move forward with any minor modifications necessary and then to implementation into SAPHIRE 8.



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## 2. Appendix

### 2.1 Design Specification Template

A design specification template is provided on the following pages.

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**Idaho National Laboratory**

Date

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# Title of Design being Specified

---

Subtitle of design being specified.

By Authors of the Design Specification

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## Chapter

**1**

# Introduction

## Problem Statement

Description of the problem being addressed can be described in any manner useful to the initiator of the design specification. This can include history, screenshots, results of current problem areas, etc...

## Chapter

**2**

# Design Details

Design can be described in any manner useful to the initiator of the design specification.

## Chapter

**3**

# Design Checklist

This section will create the design's requirements.

A check (☑) indicates an option that is completed as of the 8.X.X.XX release.

- ☐ Requirement 1
- ☐ Requirement 2
- ☐ Requirement N
  - Sub requirement to Requirement N

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## Chapter 4 Revision Log

Initial draft completed \_\_\_\_\_

## Chapter 5 Preliminary Design Review

If multiple PDRs are required for acceptance, save the signature table and documentation and add the next PDR.

Preliminary Design Review # 1				
Reviewer	Name	Date	Appraisal Status*	Notes (Explain status if necessary)
NRC Technical Staff				
SAPHIRE Project Principal Investigator or other Key Personnel				
SAPHIRE Project Software Quality Assurance Personnel				

\* Appraisal Status: 1=Accepted as is, 2=Accepted with minor modifications, 3=Rejected

Documentation: List emails, phone conversations, etc... that document the appraisal status of the design by the reviewers.

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# Chapter 6 Critical Design Review

If multiple CDRs are required for acceptance, save the signature table and documentation and add the next CDR.

Critical Design Review # 1				
Reviewer	Name	Date	Appraisal Status*	Notes (Explain status if necessary)
NRC Technical Staff				
SAPHIRE Project Principal Investigator or other Key Personnel				
SAPHIRE Project Software Quality Assurance Personnel				
* Appraisal Status: 1=Accepted as is, 2=Accepted with minor modifications, 3=Rejected				

Documentation: List emails, phone conversations, etc... that document the appraisal status of the design by the reviewers.